Nanostructural Effects at $KNbO_3$ Synthesis

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It was recently established that ferroelectric properties of oxides with perovskite-type structures (for example, $BaTiO_3$ and $PbTiO_3$) in nanocrystalic states were been reduced [1,2]. The nature of ferroelectricity at nanoscal, such as critical size dependent suppression in particles, is much debated in the literature.

Attempts to understand further the finite size effect in ferroelectric oxides led us to studies of $KNbO_3$ synthesis process from K_2CO_3 and Nb_2O_5 stoichiometric mixture at different temperatures using X-ray diffractometer.

Special attention is paid to changes in symmetry, lattice parameters and dimensions of coherent scattering areas in synthesis and stabilization processes of $KNbO_3$ perovskite structure. It is found that there are correlations between microscopic (atomic parameters and lattice constants) and mesoscopic (dimensions of coherent scattering areas) characteristics of $KNbO_3$ structure which provide an opportunity to describe not only nanostructural effects but some physical parameters of $KNbO_3$ in dependence from nano-sizes of crystal phases.

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